environment
& PARKS

A Review of Municipal Solid Waste Management Programs in Selected Canadian Provinces and U.S. States

BC
MINISTRY OF
ENVIRONMENT
AND PARKS

88-05568/

BC
C23
D18 427
1986
c.3

A REVIEW OF MUNICIPAL SOLID WASTE MANAGEMENT PROGRAMS IN SELECTED CANADIAN PROVINCES AND U.S. STATES

January 1988

Michael Stone
Economist
Planning and Assessment Branch

Dave Douglas
Solid Waste/Recycling Coordinator
Waste Management Branch

Ministry of Environment and Parks

Canadian Cataloguing in Publication Data

Stone, Mike, 1954-

A review of municipal solid waste management programs in selected Canadian provinces and U.S. states

Bibliography: p.
ISBN 0-7726-0814-8

1. Refuse and refuse disposal - United States. 2. Refuse and refuse disposal - Canada. 3. Salvage (Waste, etc.) - United States. 4. Salvage (Waste, etc.) - Canada. 5. Recycling (Waste, etc.) - United States. 6. Recycling (Waste, etc.) - Canada. I. Douglas, D. A. (David Alexander, 1945- . II. British Columbia. Ministry of Environment and Parks. III. Title.

TD 788.S76 1988 363.7'28'0973 C88-092102-1

TABLE OF CONTENTS

SECTION		PAGE
1.	INTRODUCTION	1
	1.1 Purpose and Outline	1
	1.2 Types of Solid Waste Management Programs	2
	1.3 Past and Current Programs in British Columbia	5
2.	ALBERTA	7
	2.1 Introduction	7
	2.2 Recycling Programs	7
	2.3 Procurement Programs	8
	2.4 Beverage Container and Litter Programs	8
	2.5 Comments	9
3.	ONTARIO	10
	3.1 Introduction	10
	3.2 Recycling Programs	10
	3.3 Beverage Container and Litter Programs	11
	3.4 Energy and Resource Recovery Programs	12
	3.5 Staffing Requirements	13
	3.6 Comments	13
4.	NEW JERSEY	15
	4.1 Introduction	15
	4.2 Recycling Programs	15
	4.3 Procurement Programs	17
	4.4 Beverage Container and Litter Programs	17
	4.5 Energy and Resource Recovery Programs	17
	4.6 Staffing Requirements	17
	4.7 Comments	18
5.	NEW YORK	19
	5.1 Introduction	19

TABLE OF CONTENTS (Continued)

SECTION		PAGE
	5.2 Recycling Programs	19
	5.3 Procurement Programs	20
	5.4 Beverage Container and Litter Programs	21
	5.5 Energy and Resource Recovery Programs	21
	5.6 Staffing Requirements	22
6.	RHODE ISLAND	23
	6.1 Introduction	23
	6.2 Recycling Programs	23
	6.3 Procurement Programs	24
	6.4 Beverage Container and Litter Programs	24
	6.5 Energy and Resource Recovery Programs	25
	6.6 Staffing Requirements	25
7.	WASHINGTON STATE	26
	7.1 Introduction	26
	7.2 Recycling Programs	26
	7.3 Procurement Programs	27
	7.4 Beverage Container and Litter Programs	27
	7.5 Energy and Resource Recovery Programs	27
	7.6 Staffing Requirements	28
8.	OREGON	29
	8.1 Introduction	29
	8.2 Recycling Programs	29
	8.3 Procurement Programs	30
	8.4 Beverage Container and Litter Programs	30
	8.5 Energy and Resource Recovery Programs	31
	8.6 Staffing Requirements	31
	8.7 Comments	31

TABLE OF CONTENTS (Continued)

SECTION		PAGE
9.	CALIFORNIA	33
	9.1 Introduction	33
	9.2 Recycling Programs	33
	9.3 Procurement Programs	34
	9.4 Beverage Container and Litter Programs	34
	9.5 Energy and Resource Recovery Programs	34
	9.6 Staffing Requirements	35
	9.7 Comments	35
REFERENCES		36

SECTION ONE
INTRODUCTION

1.1 PURPOSE AND OUTLINE

The purpose of this report is to review the municipal solid waste management programs and policies of selected Canadian provinces and U.S. states. This report does not deal with hazardous or special wastes programs. This report will serve as background material for a review of provincial solid waste management policies in British Columbia.

Canadian provinces and U.S. states provide a varied selection of programs to assist municipalities and local governments in the management of their solid wastes. The nature and level of support provided varies directly with the extent and urgency of the solid waste problems. The programs developed reflect the local conditions such as the availability of new landfill sites, population size and density, public acceptability of different disposal options and current disposal costs to name but a few. Thus, many of the programs developed may not be readily applicable to the needs of British Columbia. Nevertheless, a review of the approaches other jurisdictions have pursued to address their solid waste problems can provide valuable insights and lessons on how British Columbia can proceed in solving our own problems.

In the remainder of this section, four program categories are defined into which the programs of the individual jurisdictions will be grouped. This grouping is done to allow for easier comparison of programs amongst jurisdictions. Also included in this section is a review of British Columbia's past and current provincial solid waste management programs. This will allow for the comparison of other programs to the British Columbia experience and to show how and where our programs could be modified, expanded or new programs added.

The next eight sections review in turn the programs of two other provinces, Alberta and Ontario, and six states, New Jersey, New York, Rhode Island, Washington, Oregon and California. From all Canadian provinces, Alberta was chosen because of its similarity to British Columbia in size and population, while Ontario was chosen because of the variety of its solid waste management programs. The U.S. northeast is the area of that country which faces the most serious municipal solid waste management problems and where the states, in response to the problems, have recently introduced extensive support programs. The programs of New Jersey, New York and Rhode Island were chosen as good representatives of the types of programs developed to meet their current crisis. The three U.S. pacific states of Washington, Oregon and California were chosen in order to give a more regional picture and to show some of the unique programs developed on the U.S. west coast.

1.2 TYPES OF SOLID WASTE MANAGEMENT PROGRAMS

The four categories, or headings, under which the provincial and state solid waste management programs will be discussed are Recycling Programs, Procurement Programs, Beverage Container and Litter Programs, and Energy and Resource Recovery Programs. Admittedly, the choice of headings is rather arbitrary, however they will facilitate the comparison of programs across jurisdictions. The assignment of a program to a particular group is based on the type of activity the program is used to support. Described below are the types of activities supported by programs under each heading and a brief explanation of why the activities are supported.

RECYCLING PROGRAMS

Under the heading of Recycling Programs, only government programs which support the at source separation of recyclables will be reviewed. Source separation recycling operations are ones where the recyclable materials are separated from the municipal solid wastes before the wastes are collected for disposal. Support for operations which separates materials from the municipal solid waste stream after collection will be considered under the

heading of Energy and Resource Recovery Programs. The large majority of source separation operations are directed at households. Under these operations, households separate recyclable material, usually newsprint, glass and metal cans, from their household wastes and store them in a separate container. Usually, in urban areas, the recyclable materials are collected from the households at the curbside whereas rural programs have the households drop off the materials at depots. Increasingly, source separation programs are also being aimed at the business sector. For example, the collection of high grade paper from office buildings and the collection of waste lubricating oils from service stations.

Recycling operations are by no means a new phenomenon; instead many, such as scrap metal operators, have been in existence for centuries. Metals, due to their relatively high value by volume, have long been a profitable recyclable material. However, the recycling of post-consumer wastes has been a relatively recent event growing out of the conservation movement of the late 60's and early 70's. In most cases, these new recycling operations were privately run receiving little or no government support. Many of these operations failed due to the relatively low value by weight of the recycled materials and to the relatively labour intensive nature of the operations. Also due to low public participation, relatively small quantities of material were diverted from the post-consumer waste stream.

The landfill capacity crisis that hit the northeast U.S. and other areas in the early 80's has changed this picture. The recycling of municipal solid waste is no longer viewed by provincial, state and local governments as a profit making enterprise but rather as a potential waste disposal method. If the net costs of recycling, ie. collection costs minus the price of the collected materials, is less than the alternative disposal method, for example landfilling, then it is an economically desirable disposal alternative. In light of this, many governments have moved to set up programs which support the establishment and operation of community recycling programs. Indeed, in the U.S. northeast, many states, as shall be seen in subsequent sections, have made recycling mandatory.

PROCUREMENT PROGRAMS

Procurement programs are programs which support the purchase of products which are produced in whole or in part from recyclable materials. The goal of these programs is to induce producers to buy recyclable materials for use in their products and, in this manner, develop and expand the markets for recyclable materials. Examples of the types of products these programs are aimed at includes office paper, tissue paper, rerefined lubricating oils and construction materials containing incinerator ash.

The major argument in support of government procurement programs is that if government is going to increase the supply of recyclable materials, by providing grants and subsidies, it has an equal duty to increase the demand for recyclable materials. Otherwise, the large increase in supply coupled with a weak demand for the recycled materials could render the existing recycling operations unprofitable. The size of government, it is argued, also allows it to create markets for specific goods where none existed before. Other arguments in favour of procurement programs state that government purchases can provide stability to the market and provide public information on the quantity, quality and price of the available goods containing recycled materials.

BEVERAGE CONTAINERS AND LITTER PROGRAMS

The major reason why many jurisdictions have implemented mandatory beverage container deposits and other beverage containers programs was the litter problem associated with the containers. For this reason, beverage container programs will be discussed together with other litter programs rather than under the heading of recycling programs. Included in the discussion of beverage container programs will be the amount of deposit, if any, the type of containers covered, any restriction on container type, the return method and estimates of the percentage returned. Programs which support the collection of litter or the abatement of littering will also be discussed under this heading. Anti-litter programs developed because of the eyesore nature of litter which imposes a real cost on society and as a means

of reducing the potential hazards posed to the safety of people and wildlife. Beverage containers have been singled out of the litter stream for special treatment due to the size and non-degradability of the containers.

ENERGY AND RESOURCE RECOVERY PROGRAMS

Reviewed under this heading are government programs which support activities that extract energy or materials from the solid waste stream after the wastes have been collected. Energy from waste projects are divided into those that directly burn the wastes for the production of steam or electricity and those that produce refuse derived fuel (RDF) for use as fluff in a dedicated boiler or densified for delivery off-site. Resource recovery projects are those that extract recyclable materials such as ferrous and non-ferrous metals, glass, wood, etc. from the waste stream. Some projects will incorporate both energy from wastes and resource recovery.

1.3 PAST AND CURRENT PROGRAMS IN BRITISH COLUMBIA

In British Columbia the discharges of wastes into the environment are controlled and regulated by the Waste Management Act which is administered by the Ministry of Environment and Parks' Waste Management Branch. The Branch, besides administering the permit system, also provides technical advice and assistance to local governments in developing their local waste management plans. The Branch also administers the Litter Act which contains provisions for a mandatory beverage container refund system which has been in operation since 1970. The Branch has also had several past and current recycling and resource recovery programs.

The matching grant program provided one-time funds for the design and start-up of local recycling operations. The funds were to be used by a non-profit society but municipalities had to apply for and administer the grant. The maximum provincial contribution was $10,000 per applicant which the municipality had to match. However, the municipality's matching contribution could be an in-kind payment. At its height the program had a total of $100,000 available annually. The program was cancelled in 1984.

The Paper Save Program was a high grade office paper source separation program which started in 1980. At its height the program covered nine Ministry of Environment and Parks office buildings in Victoria. The program involved the use of desk-top paper holders into which staff would place their waste paper. These holders were emptied at the end of each day into a central office collection bin. When filled the bins would be collected by the janitorial staff and moved to a storage area from which the paper would be collected by a waste paper broker. However, the program has been curtailed after the program coordinator position was cancelled and after complaints from the janatorial staff to the building owners about their extra workload. Currently, only the Waste Management Branch's main Victoria office is still involved in the project.

The Oil Save Program was designed to provide for a method of collecting waste lubricating oil from households. The Ministry provided cards, signs and advertisement of service stations at which waste oil could be dropped off. There are 550 stations currently participating in the program. Most of the waste oil is collected from the service stations by Mohawk Oil Ltd. for re-refining. The Ministry now provides minimal support to the program.

The Ministry has also developed educational and information packages for teachers on recycling, composting and other solid waste disposal methods. Promotion of these packages and other educational initiatives is now undertaken by the Ministry's Information Services Branch. The Waste Management Branch also provides a $2,000 a year grant to support the Canadian Waste Materials Exchange.

The programs described above were initially the responsibility of the Waste Management Branch's Resource Recovery Section. This section had a staff of a manager, two engineers, four technicians and two Co-op students. In 1984 the section was cut to two positions and became part of a solid waste section. Currently, recycling and resource recovery is handled part-time by one person.

SECTION TWO
ALBERTA

2.1 INTRODUCTION

Alberta had a 1986 population estimated at 2,389,500. An estimated 1.8 million tonnes of solid wastes are landfilled annually which corresponds to an average disposal rate of 2.2 kg/person/day (Environment Council of Alberta, 1987a). The annual waste management costs were estimated by the same report at $86 million for 1984. A 1981 inventory of Alberta's landfills identified 1,152 sites of which 705 were active and 447 were inactive (Free, B., 1985, P. 24). The inventory found that 165 of these sites had the potential for environmental problems.

2.2 RECYCLING PROGRAMS

The Resource Recovery Grant Program of Alberta Environment provides funds to municipalities and non-profit organizations wishing to establish recycling programs. The grants assist in the capital purchases of the project only with the operator being responsible for all operating costs. In 1986, the program had $150,000 in funding available. During fiscal year 1985-86, the program awarded 23 grants ranging from $500 to 15,180 (Alberta Environment, 1986).

Alberta also operates the Oil Drop Program which is used to recover waste lubricating oil for recycling. In rural areas, the collection of oil is assisted by the installation of oil collection tanks with funding coming from the Resource Recovery Grant Program. In urban areas, the program is promoted by the use of flyers and advertisements and by encouraging service stations to accept waste oil from individuals. In 1986, the program had 250 stations participating (Alberta Environment, 1986). Alberta has two refineries which reprocess the collected oil which amounts to approximately one-fifth of provincial lubricating oil sales each year (Environment Council of Alberta, 1987b).

Alberta Environment also funds the Alberta Waste Materials Exchange which is operated by the Alberta Research Council. The Exchange publishes every two months a listing of waste materials available and wanted. Any interested companies contact the exchange who places them in contact with the other party but is not involved in any further arrangements. It is reported that during the period September 1 to November 30, 1986, the exchange had 244 listings of wastes available; 78 listings of wastes wanted, 49 listings of available services and received 139 enquiries about the listings (Environment Council of Alberta, 1987b).

2.3 PROCUREMENT PROGRAMS

Alberta presently does not have a procurement program. However, a recent report to the Alberta government recommended that they "investigate the feasibility of requesting suppliers of paper to the government to supply paper containing recycled fibre" (Environment Council of Alberta, 1987b, p. 103).

2.4 BEVERAGE CONTAINERS AND LITTER PROGRAMS

The Alberta Beverage Container Act was passed in 1971 primarily as a litter control measure. Currently, the beverages covered by the Act includes soft drinks, fruit and vegetable drinks in metal convenience cans, liquor, wine and imported beer. Domestic beer in "universal" containers, containers that can be used by more than one brand manufacturer, are exempt from the Act, however, their return is handled by a system of deposits run by the Alberta Brewer's agents. For those types of containers covered by the Act, the manufacturers and distributors are required to charge a deposit of between 2¢ and 30¢ depending on the size of the container.

The Alberta legislation is unique amongst provincial beverage container laws in the method by which consumers can return the container. Refillable containers can be returned for refund to a retailer who sells that kind of beverage container. Non-refillable and refillable containers can be

returned to a system of government licensed depots. The depots are funded by the manufacturers and distributors by a handling change of 2¢ to 3¢ per container, depending on the container size. The manufacturer and distributors must also pay a 1 1/2¢ per container handling charge to retailers for any refillable containers returned to the retailer. The manufacturer and distributors are also responsible for the collection of the containers from both the depots and retailers.

2.5 COMMENTS

The Regional Waste Management Assistance Program was set up by the Alberta Department of Environment to encourage the establishment of sanitary landfills over small local dumps. The program provides financial and technical assistance for the acquisition of land, preparation of the site and purchases of major operating equipment. Up until the end of 1984 the program had provided $14.5 million to 19 regional authorities. In a major review of waste recycling in Alberta the government-appointed Environment Council of Alberta recommended that the program be phased out and the funds used instead to provide incentives for recycling (Environment Council of Alberta, 1987a). They argued that the current capital assistance program creates an artificial preference for landfills as the cheapest waste disposal option.

SECTION THREE
ONTARIO

3.1 INTRODUCTION

Ontario has a population of 8.5 to 9.0 million people generating about 9 million tonnes of solid wastes or 2.5 kg/capita/day. Approximately 95% of all municipal wastes are currently landfilled although three incinerators are in place in Hamilton (refuse derived fuel), Metro Toronto (destructive incineration) and London Victoria Hospital (energy recovery). To typify disposal costs, Metro Toronto's tipping fee, on a regional basis, is in the order of $25 to $30 per tonne.

3.2 RECYCLING PROGRAMS

Since 1981, a Municipal Recycling Support Program, focussing on curb-side collection of source separated recyclables, has been undertaken by the provincial Environment Ministry in Ontario. In June, 1987, a more comprehensive waste reduction program was introduced directed at promoting a "4R" policy to reduce, reuse, recycle and recover waste resources and for treatment/disposal upgrading. The Environment Ministry has committed $4 million to seven different grant streams for municipal recycling support in fiscal 1987-88 and a further $4 to $5 million to a comprehensive waste reduction program. The former is supplemented by a further $5 million from OMMRI and it is conjectured that a total of $40 million in total will be allotted from both sources during the three year period to 1990. The seven areas funded are:

1. Feasibility studies for municipally endorsed studies, to 50%;
2. Operating grants for multi-material municipal programs on a sliding scale of support from 50% to 10% over five years;
3. Promotion by municipal programs up to 50% and 10 cents per capita;
4. Capital costs for municipal operations considered on individual basis (limited in practice to 33%);

5. Household containers at 100% to municipal Class 1 programs;
6. Education to a maximum per project of $15,000; and
7. Demonstration projects to 100% of costs.

Recycling activities are closely linked with the beverage container sector in the province and considerable funding for the curbside collections which predominate these activities for municipal wastes is provided by the container industry. Further support of the programs is offered by regional and municipal authorities, and by private hauling companies by means of diversion credits. These subsidies typically vary from approximately 1/3 of the landfill tipping fee to some value ($5 to $10) per tonne of waste diverted. Fourteen municipalities operate curbside programs with their own public works staff. Provincial initiatives are not mandatory but local jurisdictions are able to define the level of coercion through by-laws appropriate to meet the program goals.

A consultant for the province has recently completed a report recommending a schedule of strategies to further enhance solid waste reduction and landfill diversion. Such mechanisms as tax incentives and procurement practices, which are not currently well developed, are included in that report.

3.3 BEVERAGE CONTAINERS AND LITTER PROGRAMS

Ontario has a long history of struggle with the container issue; the current Regulation, after several years in the making, was passed in December, 1985, and is applicable to soft drinks only; all beer containers carry voluntary deposits. In essence, refillable containers are defined in 5 standard sizes and carry minimum deposits which are refundable on the return of the container to retail outlets. Refillable containers must be labelled as refundable and must receive equal emphasis with non-refillables when advertising takes place off-premises. On an annual basis, brand owners are obliged to maintain at least a 40% sales share of refillables although phased reductions are allowable to 30% if recycling rates for non-refillables exceed 60%. Non-refillable containers must achieve a recycling

rate of 50% by November 1988. Failure to meet this rate renders the container illegal, or optionally, a deposit equivalent to the refillable container can be applied. Plastic bottles are permitted but all cans must be steel until September 1987. Owners are required to submit monthly reports on container sales to the provincial auditor.

At the same time, a Recycling Advisory Committee was established by Order-in-Council to advise the Minister on container recycling with regard to implementation of programs, system monitoring, funding assistance, etc. Membership is representative of the container manufacturing industry, food and beverage sectors, government, unions, recycling and public interest groups.

Independently, the beverage industry struck a steering committee, Ontario Multi-Material Recycling Inc. (OMMRI), primarily to ensure that the 50% recycling rate required for non-refillables was met. OMMRI's promotion concentrates on "Class 1" curbside programs defined as three material collection weekly, on the same day as regular refuse, using a special recycling container. It is considered that while soft drink containers constitute some 1 to 5% of the municipal solid waste stream, the wider range of materials available for capture by these programs represents closer to 20% of the waste total.

3.4 ENERGY AND RESOURCE RECOVERY PROGRAMS

Little priority is shown for incineration facilities which do not include recovery of energy. Programs are in place to promote this alternative through the Ministry of Energy, overseen by an interministry steering committee. The Ministry of Energy has budgeted $25 million for a five year program covering capital costs of energy from waste projects at 15% of cost to a maximum of $6 million per project. A wide range of wastes can qualify with municipalities qualifying for grants and the private sector for either grants or loans. Projects must involve proven design, best available

control technology, confirmed energy sales and a minimum tipping fee of $30 per tonne. No grant or loan will exceed the equity provided by the proponent.

The waste reduction funding has two distinct targets: treatment and disposal facilities and enhancement of the "4R" proram. The former provides $1 million for establishing landfills and processing facilities, funding to upgrade or close existing sites and assistance for long range municipal planning. The "4R" support includes 1/3 of capital costs for new recovery facilities, refuse derived fuel projects and composting operations. Development costs are covered to 100%. Other activities qualifying for funding include education programs, 50% of capital and promotional costs for residential bins and programs which reduce waste generation from commercial/ industrial processes.

3.5 STAFFING REQUIREMENTS

A total of 80 people are employed by the Provincial Environment Ministry to manage the solid waste program; 35 of the total are headquarter administrator and policy advisor personnel. The secondary level of resources in place at the municipal level necessary to implement the provincial initiatives was not determined.

3.6 COMMENTS

1. Despite the presence of a de-inking facility with a capacity of 90,000 tonnes per year and additional usage of about 50,000 tonnes per year by other secondary fibre users in the Province, concern has been expressed by the Canadian Association of Recycling Industries (CARI) about the ultimate stability of the newspaper market if the curbside programs in Ontario are not phased in appropriately to avoid oversupply. In the past, recovery programs supplied less than half of the post-consumer news requirement of Ontario industry but projections suggest collections to 200,000 per annum by 1990.

2. In 1986, prior to the start-up of the comprehensive program, less than 1% of the total waste stream was recycled in Ontario.

3. Despite the commitment by the soft-drink industry, both financially and philosophically, in support of the Provincial container controls, it has been reported that more than 20% of the distributors were not maintaining the prescribed minimum ratios for refillable bottles. In that regard, the Environment Ministry laid 107 charges against soft drink producers for illegal market shares of non-refillables in 1987.

4. The pressures which presently bear on waste disposal options may be exemplified by the Haultain Region which exports 70% of its solid wastes to New York State.

SECTION FOUR
NEW JERSEY

4.1 INTRODUCTION

New Jersey's population is densely concentrated and totals approximately 7.5 million people, generating about 7 million tonnes of solid waste per year, or almost 2.5 kg/capita/day. The state is served by seven landfills having tipping fees in a range of $16 to $33 (U.S.) per tonne. No municipal incinerators are in operation, although 13 facilities predominantly using mass-burn technology and ranging in capacity between 400 to 3000 tonnes per day, are reportedly planned for construction by 1990.

4.2 RECYCLING PROGRAMS

In April, 1987, after two years of legislative struggle, New Jersey enacted mandatory state-wide recycling, considered to be the most comprehensive program of its kind in the U.S. Under the State law, Counties must develop strategic plans for collection and marketing of recyclables and appoint a plan coordinator. Municipalities have responsibility for implementing the plan. New Jersey had a voluntary recycling program in place since 1982, wherein more than 75% of the 567 municipalities carried out some form of material recovery and 150 localities had mandatory separation of at least one waste component at source. In 1986, it was estimated that about 12% of tne total residential/commercial waste stream was recycled.

The elements of tne law are as follows:

1. Mandatory recycling - Counties have 6 months to designate three recyclable materials for separate collection and twelve months to enter into agreements for processing and marketing of the materials. Municipalities must pass by-laws requiring residents to source-separate these

materials and collect them. Where markets are not economic for recyclables, municipalities may be exempted from the provisions for those particular materials, have the deadline extended by one year or request state assistance. A goal of 15% diversion is set for the first year and at least 25% of municipal wastes must be recycled in the second year.

2. Funding assistance - three levies are applied per tonne of waste landfilled to create funding sources for recycling programs operated by the Counties and Municipalities, distributed by the State on the basis of the comparative rates of waste generation. The Resource Recovery Investment tax is $3/ton and has generated $47 million over 2 years. An importation tax of $1.00/ton escalating to $18/ton by 1995 will be payable by a municipality exporting wastes to another jurisdiction and a Services tax, in support of recycling operational costs, is $0.60/ton which has generated $11.4 million over the first two year period. In addition, the operator of a solid waste disposal facility, excluding transfer stations, must negotiate a Host Community Benefit with the Municipality at a minimum rate of $1/ton to finance recycling activities. Tax credits are also permitted for corporate business purposes when applied against equipment purchases used exclusively to transport or process post-consumer recyclables.

3. Enforcement - Municipalities are obliged to disallow developments for which recycling goals would not be met. Also, approvals are to be denied for any solid waste facility, including incinerators, which do not incorporate these goals. Offenders of the mandatory source separation requirement could potentially face fines or be refused garbage service although the current practice favours public education rather than funding stringent enforcement activities at the Municipal level.

5. Ancillary measures - motor oil containers must identify the contents as recyclable and retailers must post information on used oil collection centres. The State is committed to studying the management of used

tires and can assess such options as deposits on tire purchases to finance their diversion from landfills.

4.3 PROCUREMENT PROGRAM

Under the new law, the State will give a 10% price allowance to paper products containing 50% or more post-consumer fibre and will ensure that 10% of its budget for paper will apply to recycled paper purchase in 1987 and 45% of purchases in 1989. Composted material will receive priority for public landscaping activities and construction specifications will encourage recycled material additions in such products as asphalt and fuels. Leaves are banned from landfills and Counties are required to identify disposal alternatives within one year.

4.4 BEVERAGE CONTAINER AND LITTER PROGRAMS

There are no legislated container return systems in place in New Jersey although the beverage industry does encourage recovery of some containers. The State has newly required, however, that plastic containers must attain the same recycling rate, within 18 months, as glass and aluminum containers or legislative action will be considered. The recycling rate is calculated as a weight percentage of the total municipal waste stream.

4.5 ENERGY AND RESOURCE RECOVERY PROGRAMS

While no incentives specific to incineration exist, new facilities can apply for no interest loans from a fund of $167 million dedicated from the State budget for both landfills and incinerators. The pay-back period is established as 23 years and the revolving fund gives preference to incineration plants which recover energy.

4.6 STAFFING REQUIREMENTS

Solid waste management is undertaken by 112 people at the State level of whom 43 are headquarter staff involved with planning, policy development

and administration. These functions are shadowed in the local government levels which since the passage of new legislation has increased from 1-2 people to 6 or 7. The State has added 20 positions since the enactment and expect approval in the fall of 1987 for a reorganization of the solid waste function to effectively double the present staffing levels.

4.7 COMMENTS

1. Despite the substantial commitment of money and personnel, recycling will apparently only be mandatory where the economics are favourable.
2. Funding of municipal programs is reportedly paid on the basis of waste generation rather than waste diversion rates.
3. Electricity generation is said to be repayable at 16.5 cents/kwh or about 10 times the rate in B.C.

SECTION FIVE
NEW YORK STATE

5.1 INTRODUCTION

New York State had an estimated 1985 population of 17.8 million people, over half of which are concentrated in the New York City metropolitan area. The State generates approximately 17.5 million tons of municipal solid waste per year, of which 80% is landfilled, 16% is recycled, incinerated or used in waste-to-energy facilities and 4% is shipped out of state. The State government refers to the current landfill situation as a "capacity crisis" (New York, Department of Environmental Conservation, 1987). Many communities do not have adequate disposal sites and must transport their waste long distance, sometimes out of state, at a high cost, up to $86/ton (U.S. dollars). The State estimates that all existing state landfills will be full and closed by 1995. New York State's plight was highlighted internationally by the recent futile 6,000 mile 76-day journey of a garbage barge through the Caribean searching for a disposal site.

5.2 RECYCLING PROGRAMS

The Department of Environmental Conservation requires that detailed analysis of source separation/recycling be part of the environmental review process for municipalities proposing new waste-to-energy facilities or landfills. If, in the Department's opinion, a recycling operation is feasible, then its implementation becomes a condition for the operation of the waste disposal facility. The State legislature has made $3.247 million available to assist municipalities throughout the State in establishing recycling programs with a further $3 million available for the New York City metropolitan area.

The Department of Environmental Conservation also operates the Save-That-Office-Paper (STOP) Program. The program collects and recycles office

paper with the proceeds going to charity. The program is a desk-top source separation operation. The STOP program has been adopted by other state departments, municipalities, a university and one multi-national business.

The State has set out an ambitious recycling program in its new solid waste management plan under which 50% of solid wastes are to be recycled by 1997. While the State does not, at this time, plan to make municipal recycling mandatory, it may do so in the future. The State plans to introduce legislation providing for 50% state funding of recycling equipment. Additional funds will be made available to assist municipalities in planning and preparing new recycling operations.

The State is examining two options to provide the revenues necessary to fund the recycling and other waste management programs. The first is the imposition of a state tipping fee of approximately $31/ton at all state disposal facilities. The second is the imposition of a statewide products disposal tax or waste initiator's fee. This tax or fee would range from one to three cents per item depending on the recyclability of the packaging utilized. The tax or fee would provide the consumer with an incentive to purchase products packaged in recyclable materials. Other planned state recycling initiatives include the establishment of a waste exchange and a public education program.

5.3 PROCUREMENT PROGRAMS

State law currently requires that the Office of General Services "purchase recycled paper whenever the price is reasonably competitive and the quality is adequate for the intended purposes". The law allows for a 10% price preference for recycled paper. Under this program 60% of the State's purchases contain recycled paper. The State intends to increase this share to 75% by increasing the price preference to 20%. In addition it is planned that the State only contract with printers who use recycled paper. Furthermore, it is proposed that legislation be introduced which would set procurement standards which would favour the use of other recycled materials such as petroleum products, rubber and construction materials.

5.4 BEVERAGE CONTAINER AND LITTER PROGRAMS

In 1983 New York became the ninth state to pass beverage container deposit legislation. The Returnable Container Law places a 5¢ per container deposit on most beverage container irregardless of container size. The law also calls for a 1.5¢ per container handling fee to be paid to the retailer by the Bottler when the containers are returned. The 1986 return rate was 84% for all cans, 80% for glass containers and 50% for plastic containers. In total 4.8 billion containers out of a total 5.8 billion were returned for refund. The state estimates that the deposit system has led to a 3-5% reduction in total solid waste tonnage (New York, 1987a). The state's solid waste management plan calls for the deposit on 32 and 64 ounce containers to be raised to 10¢ each by 1990 and for wine, wine cooler and liquor containers to be included under the deposit legislation. In addition the retailers' handling fee is to be raised to 2¢ per container.

5.5 ENERGY AND RESOURCE RECOVERY PROGRAMS

New York State currently has seven operating energy-from-waste facilities with a further six facilities under construction. The total capacity of the 13 facilities will be 8,852 ton/day. Two of the facilities produce refuse-derived-fuel with the remainder being mass burn facilities. Municipalities have another 31 facilities in planning stages or under consideration with a further capacity of 6,952 tons/day.

Under the State's Environmental Quality Bond Act of 1972 the State has set aside $166.8 million to assist municipal energy-from-waste facilities. A further $48 million has been allocated from the Municipal Air Quality Improvement Project category of the Act. In addition, the State provides technical assistance in the development of energy-from-waste plans. Finally, State legislation requires that utilities purchase any electricity produced by an energy-from-waste facility at 6¢ per kilowatt (7.8¢ Canadian). Future plans are to amend the utility legislation to read 6¢ per kilowatt or the utility's avoided cost of fuel, whichever is greater.

5.6 STAFFING REQUIREMENTS

In January 1987 the state created the Bureau of Source Reduction and Recycling within the Department of Environmental Conservation's Division of Solid and Hazardous Waste. The bureau has an initial staff of seven people which is expected to grow over time.

SECTION SIX
RHODE ISLAND

6.1 INTRODUCTION

Rhode Island is one of the smallest U.S. states with a surface area of only 3,139 sq. km. Its 1985 population of 968,000 people generated an estimated 864,393 tons of refuse for a generation rate of 2.2 kg/person/day. As with the other states in the U.S. atlantic seaboard, Rhode Island is rapidly running out of suitable landfill space. In response the State government has taken over central planning for municipal solid waste management and instituted alternative disposal methods to landfilling.

6.2 RECYCLING PROGRAMS

The Rhode Island Recycling Act of 1986 requires that a minimum of 15% of the State's total municipal solid wastes be recycled by 1992. Municipalities must start their recycling programs according to an implementation schedule developed by the State's Department of Environmental Management and must meet the 15% minimum recycling requirement within three years of starting operation. The state plans for the recycling rate to reach 20% by the year 2000 and 25% by tne year 2005. The Act also requires that any material brought to a state-owned disposal facility must be separated into its recyclable and non-recyclable components. Recyclable components include newspaper, glass food and beverage containers, aluminum, tin coated steel and steel cans and white goods. Other materials, such as plastic beverage containers and milk jugs, may be added in the future as economic, technical and environmental conditions warrant.

Municipalities are free to choose the method of separating the recyclable materials, however, their recycling plan must have State approval. For most municipalities this will entail a housenold source separation program. Municipalities can either sell the recyclable materials they collect commercially or deposit them at no charge at a state disposal site. In the latter case, the State will undertake to market the materials.

Municipalities who meet their recycling requirements are charged a subsidized per ton tipping fee for their non-recyclable materials of $9 in 1987, $10 in 1988, $11 in 1989, $13 in 1990 and rising 7 1/2% per annum thereafter. Those municipalities not separating their recyclables will be charged the commercial rate tipping fee, which is based on the break-even tipping fee for the disposal site, currently at $39/ton (U.S. dollars).

The Act provides grants to municipalities for both the set-up of their recycling programs and for the total cost of its operation during the first three years. In addition, the State provides the containers for each household in which the recyclable materials are to be stored. The total cost of the grants for 1987 is estimated at $2 million with an estimated $25 million to be spent over the next three years.

6.3 PROCUREMENT PROGRAMS

The Rhode Island Recycling Act stipulates that "when purchasing paper products, the department of administration shall, whenever the price is reasonably competitive and the quality intended, purchase the recyled product." Reasonably competitive is defined as "a cost premium of no greater than five percent (5%) over the lowest bid or price quoted by suppliers offering non-recycled paper products." To qualify the recycled paper products must contain by weight at least 50% secondary and post-consumer wastes and at least 25% post-consumer wastes. In addition, when requesting bids on other products which could have recycled components, information on the recycled content will be requested. Potential products include oil, plastics, compost material, aggregate, solvents and rubber products.

6.4 BEVERAGE CONTAINER AND LITTER PROGRAMS

The state does not have a mandatory deposit on beverage containers but instead funds a litter clean-up and anti-litter education program. The 1984 Litter Control and Recycling Act provides funds from a tax of 5 cents per case of soft drinks and beer distributed in the state. The tax is expected

to generate $1-1.5 million (U.S.) annually. The revenues will now also be used to finance part of the recycling programs of the new Rhode Island Recycling Act.

6.5 ENERGY AND RESOURCE RECOVERY PROGRAMS

The Rhode Island Recycling Act created the Rhode Island Solid Waste Management Corporation to run the State's central landfill site and to construct and operate three 750 ton per day mass burn energy recovery facilities. Only one of the proposed facilities is currently under negotiation for construction. It is not known if they will produce steam, electricity or both. The Act provide for tne State subsidization of any net cost of operating the facilities.

6.6 STAFFING REQUIREMENTS

The state has four to five personnel working on its new recycling program. In addition, the state-owned Rhode Island Solid Waste Management Corporation runs the central landfill and will operate the energy from waste facilities.

SECTION SEVEN
WASHINGTON STATE

7.1 INTRODUCTION

Washington State had a 1985 population estimated at 4.4 million. A 1986 study (Matrix Management Group et al, 1987) estimated that the state generated 3,066,228 tons of municipal solid wastes of which 15% or 463,387 tons were recycled. The estimated waste generation rate is 1.91 kg/person/day.

7.2 RECYCLING PROGRAMS

The state provides funding under its Litter Contol and Recycling Grant Program for the education and promotion of recycling at the community level. The program's priorities under its recycling activities are for projects which result in "waste stream reduction and the increased utilization and purchasing of products made from recycled material" (Washington, 1987a, p. 5). Projects which will be funded include public education projects, public involvement projects, strategy and program development projects and the development of recycled paper procurement ordinances. The grant program is aimed at the education and promotion of recycling and not at the provision of capital or operational funding of recycling programs. The list of ineligible costs specifically includes the cost of recyclable material collection and capital machinery such as balers, vehicles, etc.

The funding is only available to county and municipal governments who have developed local solid waste management plans which address litter and recycling activities. The grants will fund up to 80% of the direct cost of the project with the local government providing the remaining 20%. The local government's portion may be an in-kind contribution. Total funding available during 1986 for the Litter Control and Recycling Grant Program is $335,000. Individual grants have varied in size from $1,500 to $80,000 (U.S.).

7.3 PROCUREMENT PROGRAMS

Washington State introduced in 1982 a procurement policy dealing with recycled paper only. The policy gives a preference to paper products containing 50% postconsumer paper. The preference is only given for tie bids.

7.4 BEVERAGE CONTAINER AND LITTER PROGRAMS

Washington State has taken a unique course in the control of its beverage containers and general litter problems having rejected the mandatory beverage container deposit used in many other jurisdictions. Instead, in 1971, the state passed the Model Litter Control Act which provided stiff littering penalties, the provision of roadside disposal containers and the distribution of litter bags to licensed vehicles. However, the most unique feature of the Act was the imposition of a litter tax on manufacturers, wholesalers and retailers "whose products including the packages, wrapping and containers thereof, are reasonably related to the litter problem" (70.93.130 of the Act). The tax is 0.015 of one percent of the value of the product. The funds collected by the tax are used to fund litter control, recycling and public education programs throughout the state.

7.5 ENERGY AND RESOURCE RECOVERY PROGRAMS

In 1980 Washington State issued a $97 million general obligation bond to provide funds to assist municipal and county governments in the construction of new solid waste management facilities. The state grant funds 50% of eligible cost which included feasibility, design, administration and comprehensive planning as well as construction costs. Only municipalities and counties are eligible for the grants. As of the fall of 1986 all available funds had been committed.

The state currently has three energy-from-waste/incineration facilities in operation or under construction with a combined daily capacity of 750 tons. There are a further six facilities in the design and planning stages

which would have a combined capacity of 7,550 tons per day. The total capacity for all nine facilities would be 8,300 tons per day. At least six of these plants will produce electricity with the known planned capacity of four of them totalling 52.1 megawatts.

7.6 STAFFING REQUIREMENTS

The Department of Ecology's solid/hazardous waste management program has 89 full time equivalent positions listed in their fiscal year 1987/88 program plan (Washington, 1987b).

SECTION EIGHT
OREGON

8.1 INTRODUCTION

Oregon has a population of about 2 million people estimated to generate solid waste at a rate of 2.5 kg/person/day, for an annual total of 2 million tonnes. The predominant means of disposal is by landfill with tipping fees for urban areas in the order of $16 per tonne and predicted to double in the coming years; rural fees are difficult to typify but they depend on the setting and are generally lower. Apart from a number of small modular incinerators on the southern coast, the only substantial incinerator is a $47.5 mission, 550 tonne/day mass-burn plant in Marion County, commissioned in 1986. The unit cost for this facility is reported to be $31 tonne inclusive of energy revenues from the production of electricity. Metro Portland is considering 1200-1400 tonne/d to be operational by 1990.

8.2 RECYCLING PROGRAMS

By far, the most significant State initiative is represented by the Opportunity to Recycle Act, passed in 1983. The law charges local governments with providing, at a minimum:

i. recycling depots at landfills or other convenient locations;
ii. curbside collection monthly for populations of 4,000 or more;
iii. an education/promotion program on recycling;
iv. an implementation report;
v. program to be in place by July 1, 1986.

In the outcome, about 100 communities have established multi-material curbside collection but only a few use dedicated containers. No goals for diversion of materials from disposal sites are set but should an assessment by the Department of Environmental Quality (D.E.Q.) of annual reports find

that efforts are unsatisfactory, the local authority could be forced to implement improvements to the recovery program.

To facilitate the removal of scrap tires from the waste stream, a surcharge has been placed on the sale of replacement tires in the State. One dollar was fixed as the amount necessary to subsidize recycling, finance clean-up projects for accumulated stockpiles and administer the program. The most consistent State role in solid waste reduction is in public education, technical research and recycling promotion. In this respect, a school curriculum course on waste management and recycling was developed in recent years and is now in place.

While no direct State funding is applied to waste reduction, three tax credit programs are available to assist the development of the recycling industrial sector. The Department of Energy provides for 35% corporate income tax credit over a five year period for any equipment used solely to transport or process recyclables. D.E.Q. allows up to 50% credit over ten years relative to the certified value of a facility recovering resources, including emission controls for incinerators. The third program applies tax credits specifically to plastic wastes and provides up to 50% allowance over five years for equipment to manufacture new products from reclaimed wastes.

8.3 PROCUREMENT PROGRAMS

As a procurement policy, the State provides a 5% price preference on all recycled products which meet purchasing specifications. For paper purchases specifically, recycled content is defined as 50% secondary waste materials or 25% post-consumer waste.

8.4 BEVERAGE CONTAINER AND LITTER PROGRAMS

Oregon passed its container law in 1971, post-dating the Litter Act by several months. The two enactments are similar in application being retail based, stipulating refunds rather than deposits, controlling only soft-drink

and beer-type beverages and are non-restrictive of allowable container designs. Prior to the legislation, cans represented a 30% market share which dropped to 5% immediately after the law was passed and have now rebounded to 70% of total sales. The Act was primarily directed at litter control with landfill reductions almost an unconscious, secondary by-product. Overall return rates are estimated to be 90-95% of total sales.

8.5 ENERGY AND RESOURCE RECOVERY PROGRAMS

There is no State policy specific to the promotion of incineration but a hierarchy of preference values incineration with energy recovery above landfill disposal options.

8.6 STAFFING REQUIREMENTS

The Oregon D.E.Q. retains three full-time positions for its waste reduction and recycling function and a further four staff members, soon to be increased, to manage its broader solid waste management programs for landfill and incineration regulation and policy development.

8.7 COMMENTS

1. The opportunity to Recycle Act defines "recyclables" as those materials for which the cost to collect and recycle is less than the cost to collect and dispose. Accordingly, recycling is only mandated where it is economically viable to do so.

2. No auditing of the container return system takes place; monitoring is by "eye-ball" estimate only. The 90-95% return rate with the presence of 70% cans by sale volume is therefore questionable.

3. The thrust of the Oregon program has been directed at the development of an industrial base for recycled materials which has now a larger capacity theoretically for many recyclables than can be supplied

domestically. This base includes three corrugated cardboard mills, two waste paper mills, two glass plants and two steel foundries. The funding program in support of plastics has yet to produce any signifi-cant activity.

4. The D.E.Q.'s philosophy on curbside collection and container refunds maintains that the two strategies are compatible and complementary. It views the limiting factor in curbside success as the rate of participation and efforts should be directed at increasing this aspect rather than taking measures to upgrade the value of the recyclables collected. Refunds enhance public education and attitude components which are critical to recycling results. Once participation in curside approaches the return rate of containers under refunds, consideration might then be deserved to remove refund requirements.

SECTION NINE
CALIFORNIA

9.1 INTRODUCTION

California has a population of over 26 million people generating about 23 million tonnes per year of residential and commercial solid waste, equivalent to about 2.25 kg/capita/day. The primary disposal option is by landfill with about 600 sites currently operating throughout the State. 70% of the total waste volume is controlled by private operators. The City of Commerce is the location of the lone incinerating facility, still in the shake-down stage preliminary to full operation. It is a 300 tonne/day mass-burn plant producing 10 mega watts of electricity. The capital cost is $50 million with an associated tipping fee reported at $15/tonne. Landfill fees range from $4.60 to $45/tonne, average $7/tonne across the State while the combined average for collection and disposal is estimated at $47/tonne.

9.2 RECYCLING PROGRAMS

The underlying rationale to a Comprehensive Waste Management Plan developed in 1985 by the California Waste Management Board (CWMB) is a diversity of strategies comprising refuse-to-energy incineration, recycling and landfilling and a uniquely high dependency on the private sector to implement the necessary programs. Essentially, the Board performs an educational/promotional role in waste reduction strategies and provides the resources for technical research projects to guide policy development by local authorities. Currently, CWMB is completing an evaluation on the economics and efficiency of curbside recycling programs, the report to be available in January 1988.

Although the comprehensive plan adopted recommends a number of funding programs, including matching grants to municipalities for recycling activities, there is currently no funding assistance available at the State level.

9.3 PROCUREMENT PROGRAMS

In 1977, California adopted a 5% price preference for recycled paper products on State purchases. Recycled paper is defined as a product with 50% recycled content, including at least 10% post-consumer waste. Between 1977 and 1984, about 12% of the State's paper requirements were met with recycled paper at a gross cost for the preference policy of 1% of the total paper budget.

9.4 BEVERAGE CONTAINER AND LITTER PROGRAMS

In October 1987, the California Beverage Container Recycling and Litter Act (AB2020) came into effect establishing a state-wide goal of 80% recycling for all beer and soft-drink containers. Initially, a redemption value of one cent is applied to beverage containers, repayable to the consumer at recycling centres, not the retail outlet of original purchase. The consumer will also receive a redemption bonus accruing from the unredeemed charges and an amount equal to the scrap value of the container. Any container-type which does not attain a 65% redemption rate by 1990 will have the charge doubled to two cents and to three cents if 65% is not achieved by 1992. It is the responsibility of major retailers to ensure that there is a redemption centre located within a half mile of his store and it must be advertised at that outlet. Methods of collection are not stipulated so that a variety of drop-off, buy-back, reverse vending and curbside programs are anticipated. If the scrap value of any container is insufficient to match processing costs, an additional levy will be imposed on the manufacturer to make-up the differential. The State will determine these needs through audited surveys undertaken every six months. Annual sales of beverages controlled by the law are in the order of 10 billion units so that the total value of the fund will be about $100 million per year.

9.5 ENERGY AND RESOURCE RECOVERY PROGRAMS

California has little in the way of preferential policy for incineration except that energy recovery is favoured over destructive burning only.

Design capacities are expected to take regard of the recoverable volumes available through recycling, thus avoiding over-sizing of the facility.

9.6 STAFFING REQUIREMENTS

The CWMB which operates the solid waste program for the State has an establishment of 60-65 positions. The Beverage Container Act is administered by the Department of Conservation and 100 full-time staff are required for this function alone.

9.7 COMMENTS

1. A number of bills have recently been introduced to the State legislature for funding assistance and tax credit programs in support of recycling initiatives. Expectations are apparently not high that the bills will be passed.

2. It is understood that the 80% state-wide redemption target for beverage containers is derived from the quotient of all food containers redeemed divided by beverage container sales.

REFERENCES

Alberta, Department of the Environment, 1986. Annual Report 1985-86. Edmonton.

Environment Council of Alberta, 1987a. Recycling of Waste in Alberta: Summary Report and Recommendations. ECA87-18/RR2. Environment Council of Alberta. Edmonton.

_____, 1987b. Recycling of Waste in Alberta: Technical Report and Recommendations. ECA87-18/RR1. Environment Council of Alberta. Edmonton.

Free, B., 1985. Municipal Solid Waste - Alberta's Untapped Resource? ECA85-18/IB3. Environment Council of Alberta. Edmonton.

Matrix Management Group; Gilmore Research Group; and R. W. Beck and Associates, 1987. Washington State Recycling Survey. Washington State Department of Ecology.

New Jersey State, Department of Environmental Protection, 1987. Mandatory Statewide Source Separation and Recycling Act Summary. Trenton, New Jersey.

New York State, Department of Environmental Conservation, 1987a. New York State Solid Waste Management Plan. Albany, New York.

_____, 1987b. New York State Solid Waste Management Plan Responsiveness Summary. Albany, New York.

State of Rhode Island and Providence Plantations, Department of Environmental Management, 1987. Municipal Recycling Regulations.

Vanden Berg, N., 1986. "Recycled materials procurement Part 2". Resource Recycling. pp. 12-15, Vol. V, No. 4.

Washington State, Department of Ecology, 1987a. Litter Control and Recycling Grant Contract Guidelines. Olympia, Washington.

_____, 1987b. Program Plan Fiscal Year 1988. Olympia, Washington.